Problem 1

Give the equation of a sphere of radius 4 centered at the point $(-1, 1, 3)$.

Problem 2

The following is an equation is that of a sphere. Determine its radius and center.

$$x^2 + 2x + y^2 - 4y + z^2 - 6z = -13$$

Problem 3

Plot (draw) the vectors $\vec{u} = 3i$, $\vec{v} = 2j$ and $\vec{w} = -i + 3j$. Then (based on your drawing) plot the vectors $\vec{u} - \vec{v}$ and $\vec{v} - \vec{w}$. Check that your drawing corresponds to the prescribed algebra.

Problem 4

Find the vector with initial point $P(1, 2, 3)$ and terminal point $Q(2, 4, 1)$ then compute it's length.

Problem 5

Find a unit vector (meaning a vector with magnitude 1) that makes an angle of $2\pi/3$ with the positive x-axis. Extra credit: Find all vectors in 3-space with this property and describe them with an equation and inequality.